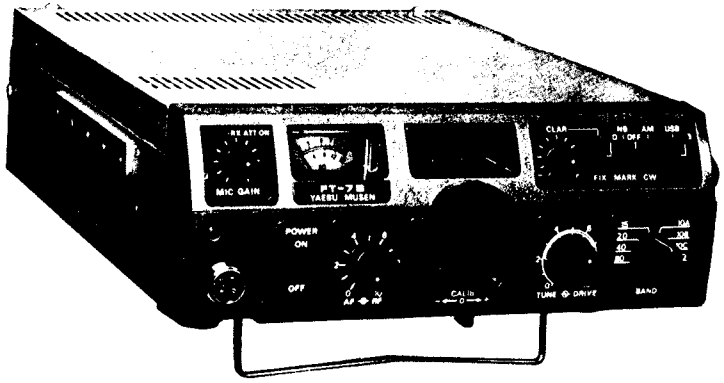
# ricetrasmettitore ft-7b con emissioni in usb-lsb am-cw




## CARATTERISTICHE

**Frequenze coperte:**

| | |
|---|---|
| 80 m | 3.5-4 MHz |
| 40 m | 6.5-7.5 MHz |
| 20 m | 14-14.5 MHz |
| 15 m | 21-21.5 MHz |
| 10 mA | 28-28.5 MHz** |
| 10 mB | 28.5-29 MHz |
| 10 mC | 29-29.5 MHz** |
| 10 mD | 29.5-30 MHz** |

** Cristalli non inclusi e fornibili su richiesta

**Alimentazione richiesta:**

13.5 VCC ± 10%
10 A in trasmissione
0.6 A in ricezione

**Dimensioni:**

| | |
|---|---|
| Larghezza | 230 m/m |
| Altezza | 80 m/m |
| Profondità | 320 m/m |
| Peso | 5.5 kg |

### TRASMETTITORE

**Tipo di emissione:**

SSB, CW, AM

**Potenza d'ingresso:**

SSB-CW 100 W CC
AM 25 W CC

**Soppressione della portante:**

migliore di 50 dB alla massima uscita

**Soppressione della banda laterale indesiderata:**

migliore di 50 dB a 1000 Hz

**Emissione spurie:**

ridotte a più di —40 dB

**Prodotti da distorsione:**

ridotte a più di —31 dB

**Risposta audio del trasmettitore:**

350 - 2700 Hz (—60 dB)

**Stabilità in frequenza:**

deriva minore di 300 Hz da freddo e minore di 100 Hz dopo 30 minuti dall'accensione

**Impedenza d'antenna:**

50 Ω

**Impedenza all'ingresso microfonico:**

500 Ω

### RICEVITORE

**Sensibilità:**

0.25 µV per un rapporto S/D = 10 dB

**Reiezione di immagine:**

dagli 80 ai 15 m - migliore di 60 dB
banda 10 m - migliore di 50 dB

**Reiezione di media frequenza:**

migliore di 50 dB

**Selettività:**

2.4 kHz (—6 dB); 4 kHz (—60 dB)

**Filtro audio regolabile:**

80 Hz (—6 dB)

**Livello d'uscita audio:**

3 W con 10% di distorsione

**Impedenza dell'uscita audio:**

4 Ω

## CONTROLLI SUL PANNELLO FRONTALE

1) EAR
Presa per una cuffia da 4-8 Ω tramite uno spinotto miniatura. L'inserzione dello spinetto esclude l'altoparlante interno.

2) MIC
Presa microfonica a quattro conduttori per l'uso contemporaneo del circuito PTT. L'impedenza del microfono è di 500 Ω.

3) POWER
E' l'interruttore principale con cui si accende e si spegne l'apparato.

4) AF GAIN
Controllo di volume per le cuffie o l'altoparlante. La rotazione in senso orario aumenta l'amplificazione.

5) RF GAIN
Controllo d'amplificazione degli stadi di alta e media frequenza. La rotazione in senso orario ne aumenta l'amplificazione.

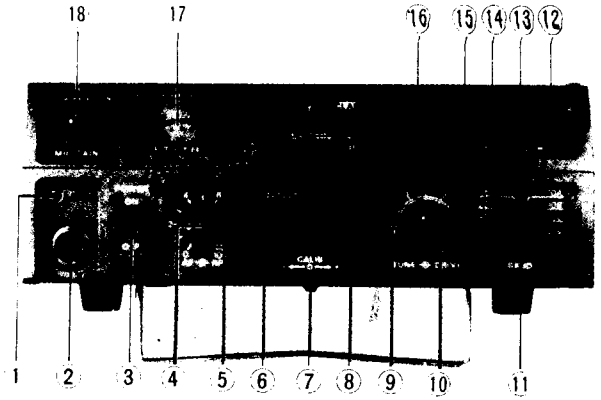
6) SINTONIA
Varia la frequenza generata dal VFO. Un giro della manopola corrisponde circa ad una variazione di 16 kHz.

7) CALIB
Attivando il circuito di calibrazione mediante l'interruttore MARK è possibile azzerare la linea di fede sul segnale di riferimento.

8) DIAL
Quadrante di sintonia principale calibrato ogni 10 kHz e con tacche aggiuntive corrispondenti ad ogni chilociclo. Il quadrante più piccolo invece porta calibrazione ogni 100 e 50 kHz.

9) TUNE
Con questo controllo si regolano contemporaneamente di picco tutti i circuiti su cui l'apparato è accordato.

10) DRIVE
Regola con continuità la potenza d'uscita del trasmettitore da circa 5 W al livello massimo.




11) BAND
Il commutatore seleziona la banda desiderata. Si ottiene la copertura di tutte le bande radiantistiche dagli 80 ai 10 metri.

12) SIDEBAND SELECTOR
Seleziona il funzionamento su USB oppure LSB, ovviamente con il commutatore MODE già posizionato su SSB.

13) MODE
Seleziona il tipo di funzionamento richiesto: SSB, CW oppure AM.

14) NB/MARK
Se l'interruttore è posizionato su NB viene attivato il circuito soppressore dei disturbi, mentre sulla posizione MARK si inserisce il funzionamento del calibratore con frequenze armoniche su ogni 100 kHz.

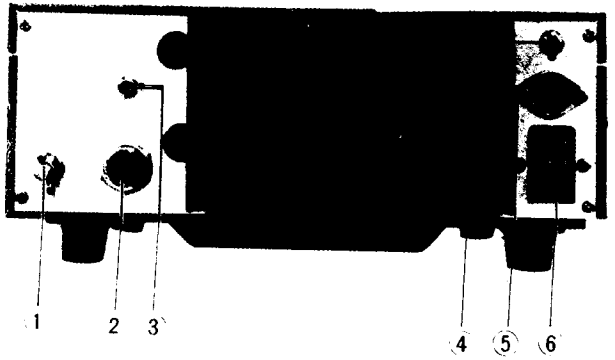
15) CLAR/VFO/FIX
Con tale commutatore viene selezionata la generazione di frequenza. Sulla posizione VFO il controllo principale di sintonia con il relativo VFO determina la frequenza. In posizione CLAR la frequenza è sempre generata dal VFO però è possibile un'escursione di ±2 kHz solamente nel ricevitore.
Sulla posizione FIX è possibile ricorrere ad un quarzo interno per il funzionamento in isoonda.

16) CLARIFIER
Quando l'interruttore 15) è posizionato su CLAR, con la rotazione di tale comando è possibile variare la frequenza del ricevitore di ±2 kHz.

17) METER
Durante la ricezione lo strumento si comporta come misuratore di livello del segnale ricevuto (S METER) mentre in trasmissione viene misurata la corrente di collettore (0-16 A) dei transistori finali di potenza.

18) MIC GAIN/ATT
Pigiando l'interruttore 20 dB di attenuazione vengono inseriti all'ingresso del ricevitore. La manopolina invece determina la sensibilità dell'amplificatore microfonico. L'inserimento dell'attenuatore in ingresso viene segnalato tramite l'illuminazione di un diodo luminoso.

## COMANDI POSTERIORI




MC-Service

# YAESU FT7B RICETRASMETTITORE 3,5 ÷ 30 MHz

## SPECIFICATIONS

**GENERAL**

**Frequency coverage:**

| | |
|---|---|
| 80m | 3.5 – 4.0 MHz |
| 40m | 7.0 – 7.5 MHz |
| 20m | 14.0 – 14.5 MHz |
| 15m | 21.0 – 21.5 MHz |
| 10mA | 28.0 – 28.5 MHz ** |
| 10mB | 28.5 – 29.0 MHz |
| 10mC | 29.0 – 29.5 MHz ** |
| 10mD | 29.5 – 29.9 MHz ** |

** 28.5 – 29.0 MHz crystal installed, other crystals available as options.

**Power requirements:**
13.5 VDC ±10% @ 10A transmit, 0.6A receive.

**Dimensions:**
230(W) x 80(H) x 320(D) mm including heat sink.

**Weight:**
5.5 kg.

**TRANSMITTER**

**Emission:**
SSB, CW, AM

**Input power:**
SSB, CW 100 watts DC, AM 25 watts DC.

**Carrier suppression:**
Better than 50 dB below rated output.

**Unwanted sideband suppression:**
Better than 50 dB @ 1000Hz.

**Spurious emission:**
Better than –40 dB.

**Distortion products:**
Better than –31 dB.

**Transmitter frequency response:**
350 – 2700 Hz (–6 dB)

**Frequency stability:**
Less than 300 Hz drift from a cold start, less than 100 Hz drift over a 30 minute period after warmup.

**Antenna output impedance:**
50 ohms nominal.

**Microphone input impedance:**
500 ohms nominal.

**RECEIVER**

**Sensitivity:**
0.25 µV for S/N 10 dB.

**Image rejection:**
Better than 60 dB 80 – 15 meters.
Better than 50 dB 10 meters.

**IF rejection:**
Better than 50 dB.

**Selectivity:**
2.4 kHz (–6 dB), 4.0 kHz (–60 dB)
CW audio peak filter: 80 Hz (–6 dB), adjustable.

**Audio output:**
3 watts @ 10% THD

**Audio output impedance:**
4 ohms

## CIRCUIT DESCRIPTION

The FT-7B utilizes plug-in circuit modules, providing efficient use of space, as well as ease of servicing. The transceiver is all solid state, and the receiver and transmitter operate in a single-conversion configuration, with a 9 MHz intermediate frequency. A premix heterodyne technique is used, providing spurious-free operation on both transmit and receive.

### RECEIVER

The signal from the antenna is fed through a low-pass filter consisting of $L_{2701}$, $C_{2701}$, and $C_{2702}$, is switched through $RL_{2}$, and is fed to the RF ATT UNIT (PB-1883). Here, 20 dB of attenuation may be placed in the antenna line by activating the front panel attenuator switch, which places $R_{3101}$ – $R_{3103}$ in the incoming signal path. The signal then passes through a tuning circuit consisting of $T_{1901}$ – $T_{1905}$ and $VC_{1901}$, and is delivered to pin 9 of the RF/MARK UNIT (PB-1884).

The signal is applied to gate 1 of the RF amplifier, $Q_{104}$ (3SK51-03), a dual-gate MOS FET. AGC (Automatic Gain Control) voltage is applied to gate 2 of $Q_{104}$ to control the gain of this stage, thus preventing overload in succeeding stages. The amplified signal is then fed through the passband tuning circuit to the MIX UNIT (PB-1631). Buffer amplifier $Q_{201}$ (2SC535A) is used to accomplish impedance matching between the RF amplifier and the diode mixer. The incoming signal is mixed by the diode mixer, consisting of $D_{201}$ – $D_{204}$ (1SS16), with the signal from the premix circuit. Schottky barrier diodes are used to secure high dynamic range with low noise characteristics.

The mixer produces a 9 MHz IF at the output of $T_{201}$. The IF signal is fed through a low pass filter consisting of $L_{201}$, $C_{201}$, and $C_{202}$, passed through diode switch $D_{205}$, and delivered to the FILTER UNIT (PB-1873). The IF signal is passed through a monolithic filter, $XF_{201}$, and is amplified by IF amplifiers $Q_{201}$ and $Q_{202}$ (2SK19GR). Noise blanker diode $D_{201}$ (1S1007) is controlled by $Q_{203}$ (MPSA13) to eliminate noise pulses.

The output from $Q_{202}$ passes through a 6-pole crystal filter and diode switch $D_{203}$ (1N60), and is fed to the IF UNIT (PB-1625). The IF signal is further amplified by $Q_{301}$ and $Q_{302}$ (both 3SK51-03). On SSB and CW, the amplified signal is fed to the ring demodulator, $D_{308}$ – $D_{311}$ (1S1007); also fed to the ring demodulator is the carrier signal from buffer amplifier $Q_{303}$ (2SC372Y).

When impulse noise is received which exceeds the charged reference voltage on $C_{413}$, $D_{401}$, and $D_{402}$ will permit negative-going pulses to turn off $Q_{204}$. Thus, $Q_{204}$ will conduct, and $D_{201}$ will be biased to block the signal passage.

The signal amplified by $Q_{301}$ (2SK19GR) is rectified by $D_{306}$ and $D_{307}$ (1N60). The rectified DC voltage is amplified by DC amplifier $Q_{306}$ (2SC372Y) and fed to the gates of $Q_{301}$ and $Q_{302}$ to control the gain of these stages.

The crystal controlled marker generator, $Q_{101}$ (2SC372Y), located on the RF/MARK UNIT, generates a fundamental 12.8 MHz signal. The 12.8 MHz signal is fed through buffer amplifier $Q_{102}$ (2SC372Y) to frequency divider $Q_{103}$ (F4024PC), which produces a 100 kHz marker signal. The 100 kHz marker signal is fed through pin 4 and pin 9 to the receiver front end.

### TRANSMITTER

Speech input from the microphone jack $J_5$ is fed through the MIC GAIN control $VR_1$ to pin 2 of the AF UNIT for SSB. The speech signal is amplified by $Q_{401}$ (TA7063P) and fed to the ring modulator, $D_{501}$ – $D_{504}$ (1S1007) in the MOD/DEM UNIT. The signal modulates the carrier signal delivered from $Q_{303}$, and the resulting 9 MHz double sideband signal is amplified by $Q_{501}$ (2SK19Y) and fed through diode switch $D_{505}$ (1S1555) to the FILTER UNIT.

The signal is amplified by a buffer, $Q_{502}$ (2SK19GR), and fed to crystal filter $XF_{502}$, where the unwanted sideband is rejected. The 9 MHz SSB signal is then fed through diode switch $D_{1503}$ – $D_{1504}$ (1S1007) to $Q_{1501}$ (3SK40LL), and the amplified signal is fed to pin 4 of the MIX UNIT. The 9 MHz SSB signal is heterodyned to the desired RF frequency by injection of the local signal supplied from the PREMIX UNIT.

The RF output from the diode mixer is amplified by $Q_{1502}$ (3SK51-03) and fed through diode switch $D_{1505}$ (1S1555) and bandpass transformers $T_{1506}$ – $T_{1511}$ to the PRE DRIVE UNIT. The bandpass transformers are used on both transmit and receive to provide extremely high selectivity.

An AM signal is amplified by $Q_{2401}$ (2SK19GR), detected by AM detector $D_{2401}$ – $D_{2404}$ (1S1007), and the resulting audio signal is amplified by $Q_{2402}$ (2SC372Y) and delivered to the AF UNIT.

When the MODE switch is placed in the CW position, $Q_{2501}$ (2SD636) causes $Q_{2502}$ (MC14016B) to switch a highly selective audio peak filter into the circuit. $Q_{2503}$ (MC1741) and associated shaping circuitry provide a bandwidth of approximately 80 Hz at 6 dB down, thus improving dramatically the system signal-to-noise ratio. $VR_{2501}$ provides adjustment of the center frequency of the audio filter. The signal is then passed to the AF UNIT.

On SSB and CW, the audio signal from the ring demodulator or audio filter, respectively, is amplified by $Q_{403}$ (2SC1000GR) and $Q_{404}$ (TA7205AP), to deliver 3 watts of audio output to the speaker. On AM, the output from the AM DET UNIT is fed directly to $Q_{405}$ for amplification.

A portion of the 9 MHz IF signal is fed to pin 2 of the NB UNIT. When the NB/MARK switch is placed in the NB (noise blanker) position, the signal is amplified by $Q_{601}$ (3SK51-03) and fed to the gate of noise blanker mixer $Q_{602}$ (3SK51-03), where an 8545 kHz signal generated by $Q_{603}$ (2SK19Y) is mixed with the incoming IF signal, producing a 455 kHz noise blanker IF. This IF signal is then amplified by $Q_{604}$ (3SK51-03).

When a carrier or noise-free modulated signal is received, the 455 kHz signal is rectified by $D_{601}$ and $D_{602}$ (1N60), and the voltage is used to charge $C_{613}$. There is no discharge loop for $C_{613}$; therefore, a signal which exceeds the charged voltage established by the reference voltage on $C_{613}$ will not pass through $D_{601}$ and $D_{602}$. Accordingly, there will be no voltage drop across $R_{619}$, and $Q_{604}$ (3SK51-03) will conduct as the gate voltage approaches zero, causing the drain to drop.

The drain of $Q_{604}$ is connected directly to the base of noise gate controller $Q_{605}$ (MPSA13), located on the FILTER UNIT. The voltage drop of the drain will turn off $Q_{605}$, causing a forward bias to $D_{606}$. As $D_{606}$ conducts, the signal will pass through the circuit.

### COMMON CIRCUITS

The carrier oscillator $Q_{105}$ (2SC372Y) is followed by buffer amplifier $Q_{106}$ (2SC372Y). Oscillation is at either 8998.5 kHz (40 – 10 meters LSB, 80 meters USB) via $X_{101}$, or 9001.5 kHz (40 – 10 meters USB, 80 meters LSB) via $X_{102}$, depending on the mode of operation. Crystal selection is made by diode switches $D_{107}$ and $D_{108}$ (1S1555). The carrier is then fed through relay $RL_{101}$, to the ring modulator/demodulator.

The LSB crystal is used for CW reception on all bands. For CW transmission, the oscillator in the IF UNIT oscillates with $X_{401}$.

A modified Colpitts type oscillator is used to generate a 5.0 – 5.5 MHz signal to produce a stable 500 kHz tuning range. The frequency is varied by $VC_{1201}$, which is geared to a precision-built dial tuning mechanism.

Varactor diode $D_{1201}$ (1S2236) is in series with $C_{1207}$, and the combination is in parallel with $VC_{1201}$. By activating the clarifier switch, the clarifier control shifts the receiver ±3 kHz.

The VFO output signal is fed through amplifier/buffer stages $Q_{1202}$ (2SK19GR) and $Q_{1203}$ (2SC372Y), the low-pass filter, and diode switch $D_{1205}$ (1S1555) to the PREMIX UNIT.

In addition to normal VFO operation, one crystal controlled channel per band may be used. Crystal oscillator $Q_{1101}$ (2SC372Y) is followed by buffer amplifier $Q_{1102}$ (2SC372Y), and its output is fed through the low-pass filter and diode switch $D_{1501}$ (1S1555) to the PREMIX UNIT. Trimmer capacitors $TC_{1101}$ – $TC_{1104}$ are used for fine adjustment of the crystal frequency.

Crystal oscillator $Q_{1901}$ (JF-1033) produces a heterodyne signal selected by the band switch. The signal is fed to the double balanced mixer $Q_{1903}$ (MC1496G) in the PREMIX UNIT, where the signal is mixed with the VFO signal. The output from the mixer is fed through bandpass transformers $T_{1903}$ – $T_{1905}$, to the broadband amplifier $Q_{1905}$ (2SK19GR), $Q_{1906}$ (2SC784R), and $Q_{1907}$ (2N4427). The premix output signal is then applied to the diode mixer in the MIX UNIT.

A portion of the premix signal is fed through buffer $Q_{1}$ (2SC372Y) to the EXT DIS jack, for use with the optional YC-7B digital frequency display unit.

In the AM mode, the speech signal is amplified by $Q_{1301}$ (2SC1000GR) and fed to the AM modulator, $Q_{1302}$ (3SK59GR), where the speech signal modulates the 8999.3 MHz carrier signal generated by $Q_{1303}$ (2SK19GR) and delivered from $Q_{1306}$ (2SK19GR). The modulated signal is delivered to $Q_{1304}$, and from there its path is identical to that of the SSB signal.

In the CW mode, the carrier signal from $Q_{1306}$ passes through $XF_{1301}$ and is fed to $Q_{1304}$. The tone oscillator, $Q_{1301}$ (2SC373), operates when the MODE switch is in the CW position. It consists of a phase shift oscillator operating at approximately 800 Hz. The tone output is activated by the keying circuit, and is coupled to $Q_{1302}$ (2SC372Y) for semi-break-in CW operation. The relay delay hold time is adjusted by $VR_{1302}$.

The emitter voltage of $Q_{1601}$ and $Q_{1602}$ is controlled by keying switch transistor $Q_{1604}$ (2SC373). A flip-flop circuit utilizing $Q_{1603}$ (MC14011B) is employed to secure a perfectly-shaped waveform for CW transmission, free of clicks at any keying speed.

The RF signal on all modes is amplified by $Q_{1001}$ (2SK19GR) and $Q_{1002}$ (2N4427), and delivered to the POWER AMP UNIT. The signal is amplified by drivers $Q_{1201}$ (2SC1589) and $Q_{1202}$ (2SC2395), and the resulting output drives the push-pull power amplifier, consisting of $Q_{1203}$ and $Q_{1204}$ (2SC2099), producing a nominal power output of 50 watts. The RF signal passes through the low-pass filter, as well as the CM coupler, and is delivered through antenna relay $RL_{1}$ to the antenna. $Q_{1205}$ (2SD235), as well as diodes $D_{1503}$ – $D_{1506}$ (10D10), provide bias compensation and thermal runaway protection for the final transistors.

$T_{1001}$ detects the forward and reflected waves of the transmit signal. The forward wave is rectified by $D_{1005}$ (1S1555), and the reflected wave by $D_{1004}$ (1S1007), to generate ALC voltage. The ALC threshold level of the forward wave is set by $VR_{1501}$.

When there is an excessive amount of reflected power, the reflected wave is rectified by $D_{1004}$, producing minus voltage on the ALC line. The ALC voltage reduces the gain of $Q_{104}$ to prevent overloading or distortion.

## MAINTENANCE AND ALIGNMNT

### GENERAL

This transceiver has been carefully aligned and tested at the factory prior to shipment. The reliability of the solid state devices used in the FT-7B should provide years of trouble-free service if the equipment is not abused and the proper routine maintenance is carried out.

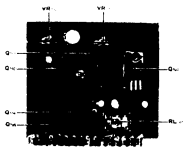
Do not attempt to align the transmitter without having a proper dummy load or antenna connected to the transceiver. We highly recommend off-the-air testing using a dummy load as a courtesy to other operators.

The following alignment procedure requires certain test equipment such as an RF signal generator, an audio oscillator, a sweep generator, an oscilloscope, and a VTVM. Without proper test equipment, do not attempt to adjust cores or potentiometers.

### CONTROL UNIT (PB-1622)

(1) CW relay delay adjustment ($VR_{102}$)
- (a) Connect a dummy load or matched antenna to the ANT connector. Connect a key to the KEY jack, and place the MODE switch in the CW position.
- (b) When the key is closed and then opened again, it will be observed that there is a delay between the instant the transceiver returns to "receive". The length of the delay may be varied by adjustment of $VR_{102}$, in order to provide the proper delay for the keying speed used and for the preferences of the individual operator.

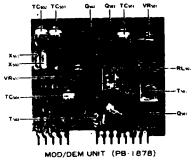
(2) Sidetone level adjustment ($VR_{101}$)
- (a) The level of the CW sidetone may be adjusted by varying $VR_{101}$ while the key is closed.



CONTROL UNIT (PB-1622)

### MOD/DEM UNIT (PB-1878)

(1) SSB carrier point ($TC_{501}$, $TC_{502}$):
- (a) Settings: BAND ..... 20
  DIAL ..... 14.25 MHz
  MODE ..... CW
  Peak the TUNE control to secure maximum output.
- (b) Place the MODE switch in the USB position. Connect the output of an audio oscillator to the microphone input. Set the frequency to 1 kHz and transmit on USB. Adjust the MIC GAIN control for 40 watts RF output to the dummy load.
- (c) Shift the audio frequency to 300 Hz without changing the audio output level or MIC GAIN control.
- (d) Switch between USB and LSB, while adjusting $TC_{501}$ for USB and $TC_{502}$ for LSB to obtain 10 watts output on each sideband.
  (Note: For the 80 meter band, $TC_{502}$ will adjust LSB and $TC_{503}$ will adjust USB, but the alignment here is taking place on 20 meters.
- (e) Return to the receive mode. Switch the MODE selector back and forth between USB and LSB. The tone quality of the background noise on the two sideband modes should sound alike.



MOD/DEM UNIT (PB-1878)

### IF UNIT (PB-1625)

(1) CW carrier level adjustment ($TC_{301}$)
- (a) Connect the RF probe of a VTVM to pin 2 of the IF UNIT. (PB-1625) With the MODE switch in the CW position and the key closed, adjust $TC_{301}$ for a reading of 75 mV ±10 mV.

(2) S-meter calibration ($VR_{301}$)
- (a) Place the band switch on 20 meters, set the VFO to 250, and the MODE switch to USB. Connect a signal generator to the antenna receptacle, and set the generator frequency to the receiver frequency.
- (b) Adjust the signal generator output to 87 dB. Adjust $VR_{301}$ for full scale S-meter deflection.

IF UNIT (PB-1625)

| | | | |
|---|---|---|---|
| 40m | $X_{101}$ | 21.5MHz | HC 25/U |
| 20m | $X_{102}$ | 28.5MHz | HC 25/U |
| 15m | $X_{103}$ | 35.5MHz | HC 25/U |
| 10mA | $X_{104}$ | 42.5MHz | HC 25/U |
| 10mB | $X_{105}$ | 43.0MHz | HC 25/U |
| 10mC | $X_{106}$ | 43.5MHz | HC 25/U |
| 10mD | $X_{107}$ | 44.0MHz | HC 25/U |

### LOCAL UNIT

(1) Local oscillator level adjustment
- (a) Connect the RF probe of a VTVM to $TP_{1001}$. Place a 44 MHz crystal in the socket for the 10mD band. Place the BAND switch in the 10D position, and adjust the core of $T_{1001}$ for a reading of 50 mV on the VTVM.
- (b) Place a 43 MHz crystal in the socket for the 10mB band. Place the BAND switch in the 10B position. Adjust $TC_{1005}$ for a reading of 50 mV on the VTVM.
- (c) Place a 42.5 MHz crystal in the 10A socket. Place the BAND switch in the 10A position, and adjust $TC_{1006}$ for a 50 mV reading on the VTVM.
- (d) Place a 43.5 MHz crystal in the 10C socket. Place the BAND switch in the 10C position, and adjust $TC_{1004}$ for a 50 mV reading on the VTVM.
- (e) Switch to the 15 meter band. Adjust $TC_{1003}$ for a reading of 50 mV on the VTVM.
- (f) Switch to the 20 meter band. Adjust $TC_{1002}$ for a reading of 50 mV on the VTVM.
- (g) Switch to the 40 meter band. Adjust $TC_{1001}$ for a reading of 50 mV on the VTVM.

(2) Premix bandpass filter adjustment ($T_{1902}$ – $T_{1906}$):
The adjustment of the bandpass filters is critical with respect to spurious response. A sweep generator and a scope are required for proper alignment.
- (a) Locate PB-1656, which can be found on the bottom side of the RF mother board (see photo on page 16.)
  Locate JP on PB-1656. For this alignment, remove the solder bit on the shorting device, breaking the connection.
- (b) Connect the output of a sweep generator to $TP_{1901}$, and the RF probe of a scope to $TP_{1902}$. Monitor the wave patterns on the scope by offsetting the balancing potentiometer $VR_{1901}$ on the PREMIX unit.
- (c) Set the VFO/FIX switch to FIX to disconnect the VFO from the circuit. Apply 40 dB sweep output to $TP_{1901}$. Set the BAND switch to 40m.
- (d) Remove the dummy load from the antenna receptacle and connect a signal generator to the antenna receptacle. While receiving, zero the signal generator output to the frequency to be adjusted (3750, 7250, etc.) and adjust the transformer cores below for maximum deflection of the S-meter:

| BAND | CORE ADJUSTMENT |
|---|---|
| 80 | $T_{1907}$ |
| 40 | $T_{1913}$ |
| 20 | $T_{1919}$ |
| 15 | $T_{1924}$ |
| 10 | $T_{1933}$ |

- (e) Other coils:

| UNIT | COIL | PROCEDURE |
|---|---|---|
| FILTER | $T_{901}$ – $T_{904}$ | Peak to 9MHz on receive |
| | $T_{905}$ | Peak to 9MHz on transmit |
| IF | $T_{801}$ – $T_{805}$ | Peak to 9MHz on receive |
| MOD/DEM | $T_{501}$ | Peak to 9MHz on transmit |
| NB | $T_{601}$ | Peak to 9MHz on receive, NB ON |
| | $T_{602}$ – $T_{603}$ | Peak to 455 kHz on receive, NB ON |
| | $T_{604}$ | Peak to 8545 kHz on receive, NB ON |

### ALC UNIT (PB-1881)

- (a) Connect a 50 ohm dummy load/wattmeter to the antenna receptacle. Set $VR_{1501}$ to the fully clockwise position. Set the BAND switch to 10B, set the MODE switch to LSB, and peak the TUNE control for maximum background noise. Apply a 1 kHz 6 mV tone to the microphone jack, and advance the MIC GAIN control until a power output of 40 watts is achieved.
- (b) Connect the VTVM, set to a DC 1.5 volt scale, to TP (thru capacitor $C_{1}$). Adjust $TC_{1501}$ for a minimum VTVM indication while transmitting.
- (c) Peak transceiver for maximum output on 80 meters, CW mode. While transmitting, slowly rotate $VR_{1501}$ until the power output just starts to fall; the power output should be 50 – 55 watts. Do not make this adjustment with other than a 50 ohm dummy load; a high SWR condition on the transmission line will cause an improper setting of $VR_{1501}$.

### AM MOD UNIT (PB-1874)

(1) For proper adjustment of the carrier and modulation levels, set $VR_{1101}$ fully clockwise (no ALC action). Transmit on AM in the 10B band, and set $VR_{1101}$ for a power output of 15 watts into a dummy load.

(2) Apply a 1 kHz, 6 mV audio signal to the mic jack. Connect an oscilloscope to the antenna jack and the dummy load, for monitoring of the output a waveform. For proper operation, a setting of between 5 and 8 should produce 100% modulation of the waveform.

### AM ALC UNIT (PB-1937)

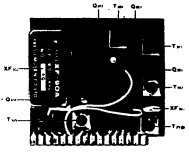
The AM ALC UNIT is located on the AM Mother Board.

(1) While transmitting into a dummy load on AM, with on modulation applied, adjust $VR_{1101}$ for a power output of 12.5 watts. This adjustment must be made after the adjustment of $VR_{1101}$ described above.

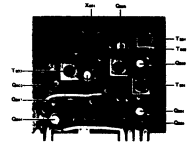
### CW PEAK FILTER (PB-1882)

(1) Tune the receiver to the marker signal on 20 meters, LSB mode. Tune for a beat note of 800 Hz.

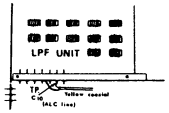
(2) Place the MODE switch in the CW position. Adjust $VR_{1401}$ for maximum audio output on the marker signal.



FILTER UNIT (PB-1873)

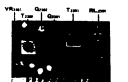


NB UNIT (PB-1627)

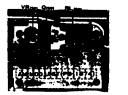


LPF UNIT

ALC UNIT (PB-1881)

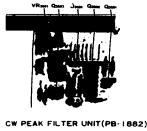


AM MOD UNIT (PB-1874)



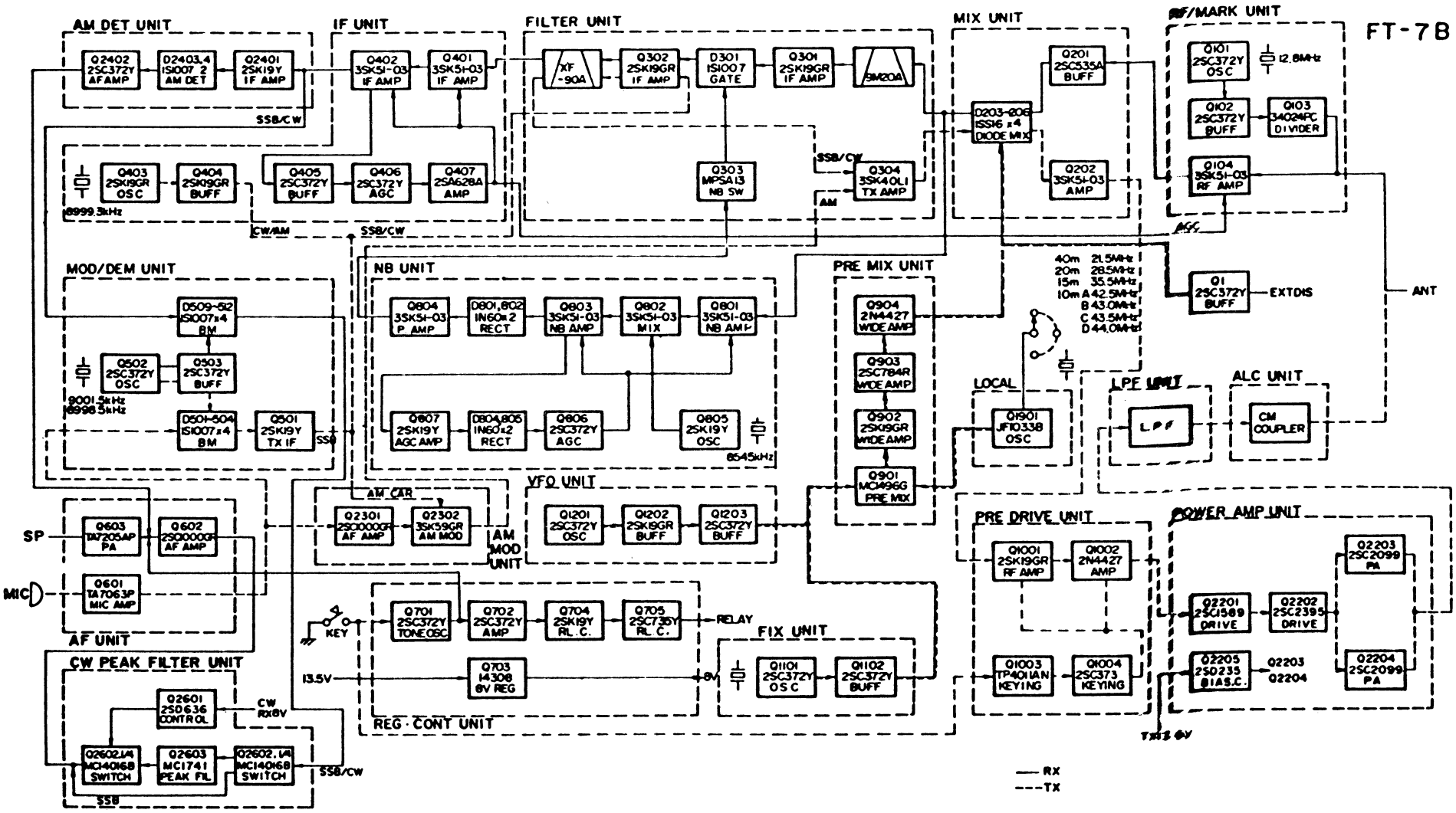
AM MOTHER BOARD(PB-1876)

AM ALC UNIT(PB-1937)



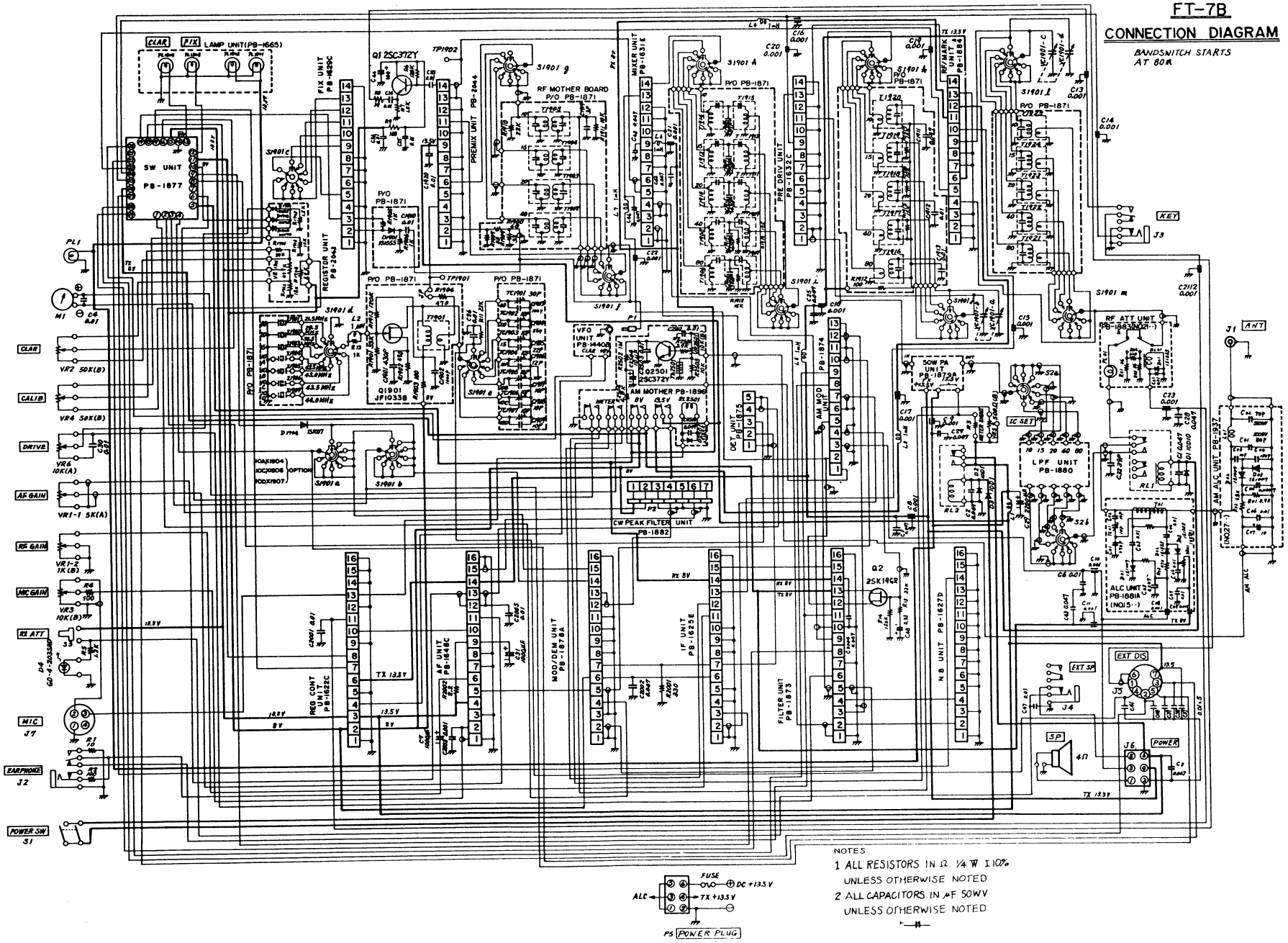
CW PEAK FILTER UNIT(PB-1882)

## SCHEMA A BLOCCHI



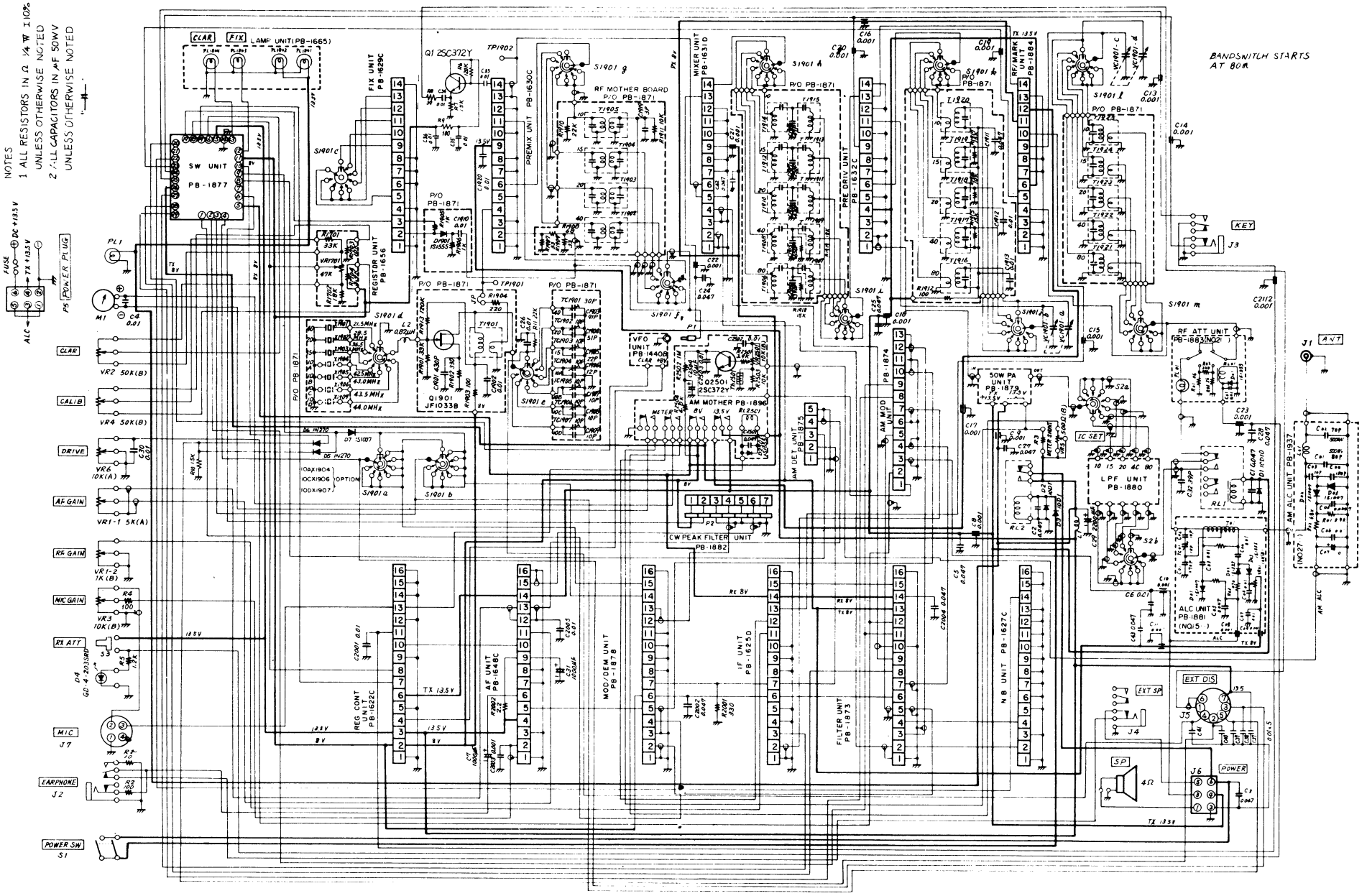
# FT-7B
## CONNECTION DIAGRAM

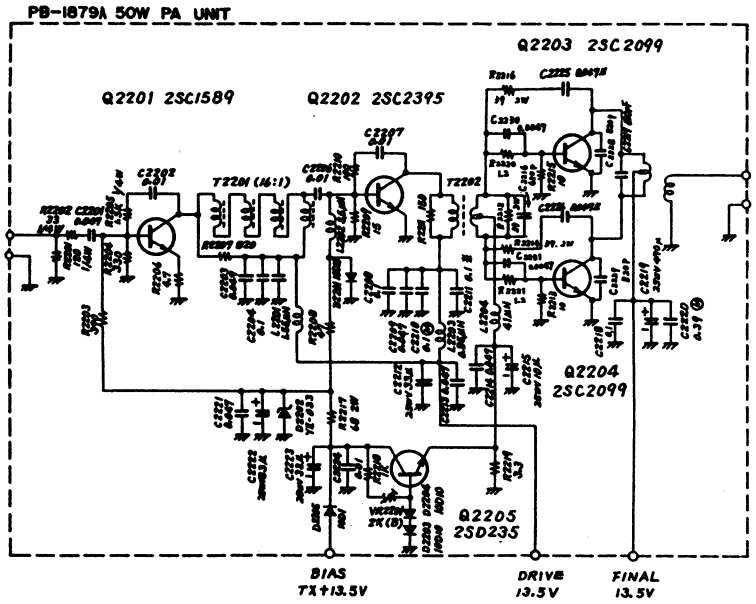
BANDSWITCH STARTS AT 80M



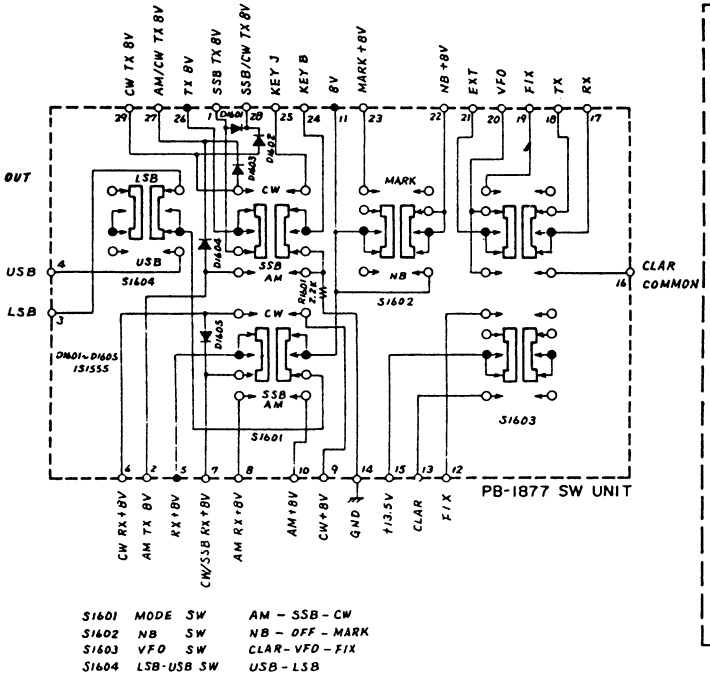

NOTES
1 ALL RESISTORS IN Ω, ¼ W ±10% UNLESS OTHERWISE NOTED
2 ALL CAPACITORS IN μF 50WV UNLESS OTHERWISE NOTED

# SCHEMA ELETTRICO RICETRASMETTITORE FT-7B



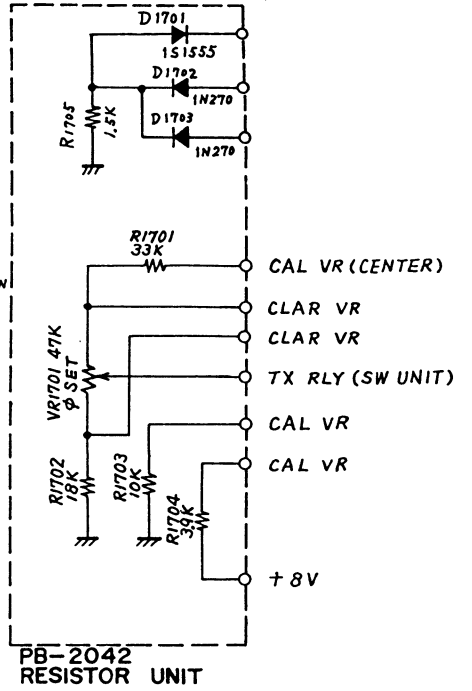


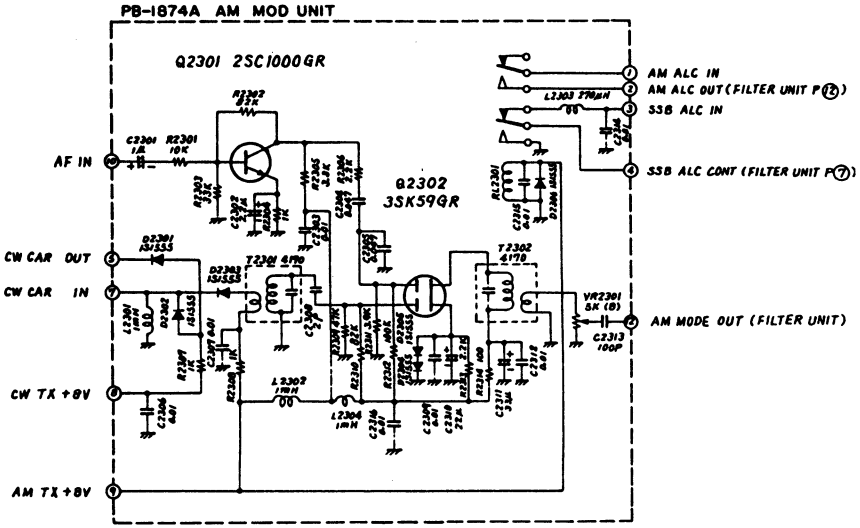

50W PA UNIT(PB-1879A)



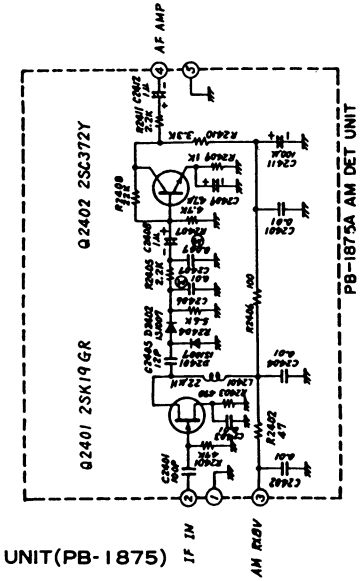

| | | | |
|---|---|---|---|
| S1601 | MODE | SW | AM – SSB – CW |
| S1602 | NB | SW | NB – OFF – MARK |
| S1603 | VFO | SW | CLAR – VFO – FIX |
| S1604 | LSB-USB | SW | USB – LSB |

SW UNIT(PB-1877)

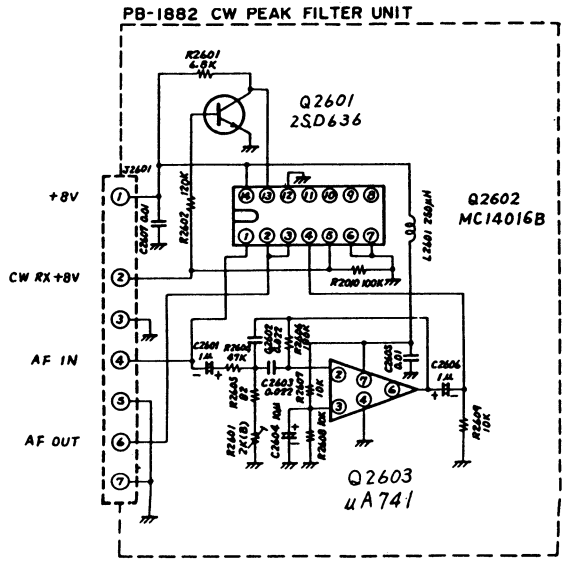



AM MOD UNIT(PB-1874)




AM DET UNIT(PB-1875)




CW PEAK FILTER UNIT(PB-1882)

## SEMICONDUCTORS

Silicon transistors:
- 2SA628A 1
- 2SC372Y 16
- 2SC373 1
- 2SC535A 1
- 2SC735Y 1
- 2SC784R 1
- 2SC1000GR 2
- 2SC2099 2
- 2SC2395 1
- 2SC1589 1
- 2N4427 2
- MPSA13 1
- 2SD235Y 1
- 2SD636Q 1

FET:
- 2SK19GR 9
- 2SK19Y 4
- 3SK40L1 1
- 3SK51-03 8
- JF1033B 1
- 3SK59GR 1

IC:
- F4024PC 1
- MC1496G 1
- MC1741 1
- MC14011BCP 1
- MC14016B 1
- TA7063P 1
- TA7205AP 1
- μPC14308 1

Schottky Diodes:
- 1SS16 4

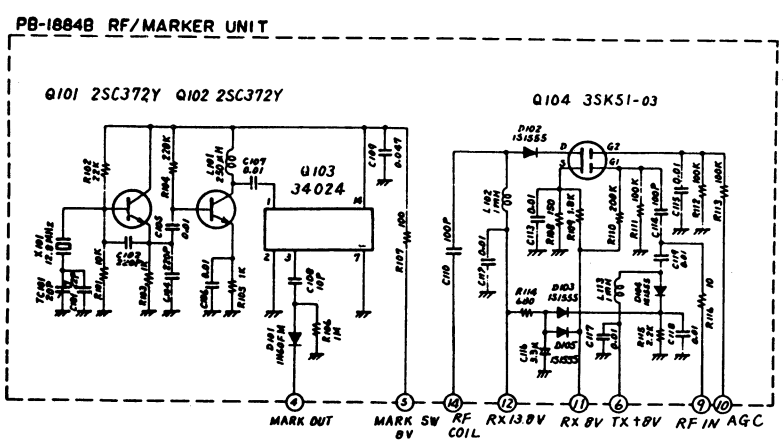
Germanium diodes:
- 1N60 5
- 1N270 4
- 1S1007 24

Silicon Diodes:
- 1S1555 43
- 10D1 4
- 10D10 3

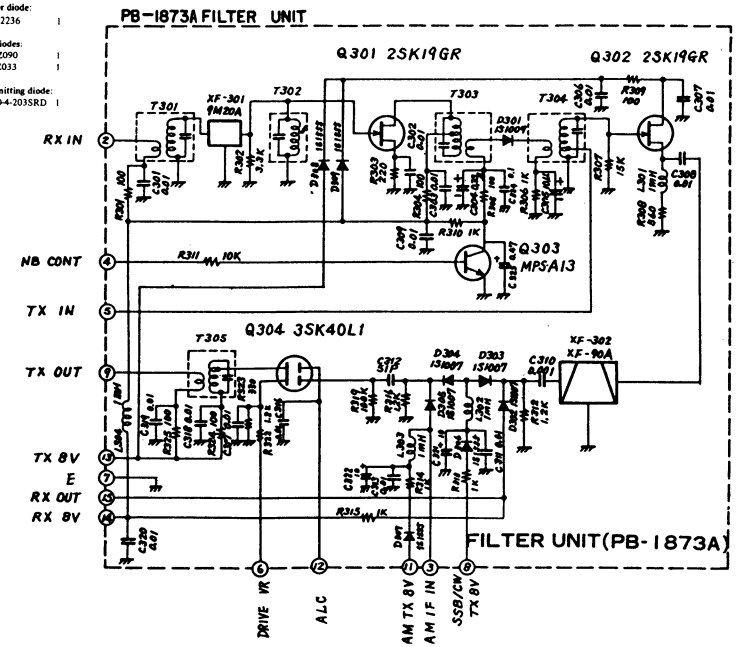
Varactor diode:
- 1S2236 1

Zener diodes:
- WZ090 1
- YZ033 1

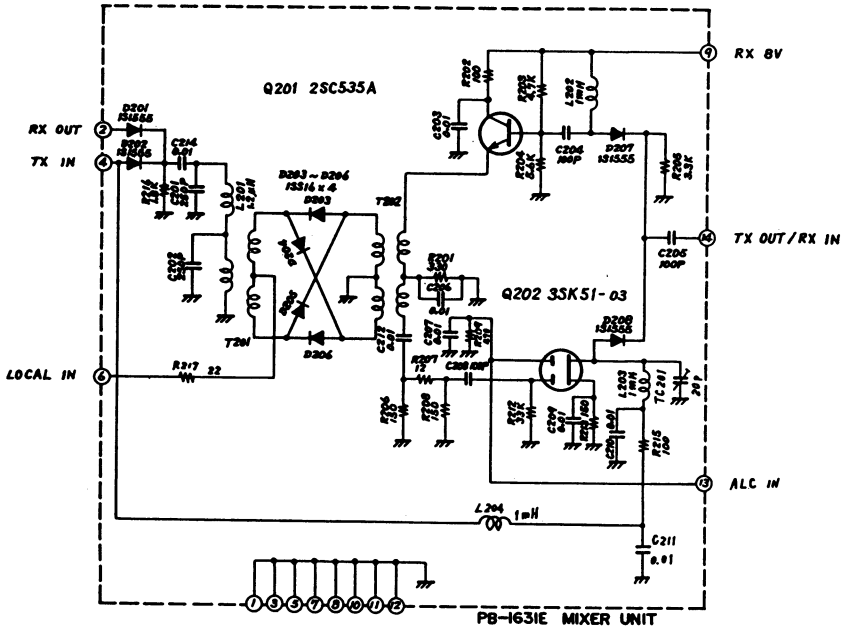
Light emitting diode:
- GD4-203SRD 1



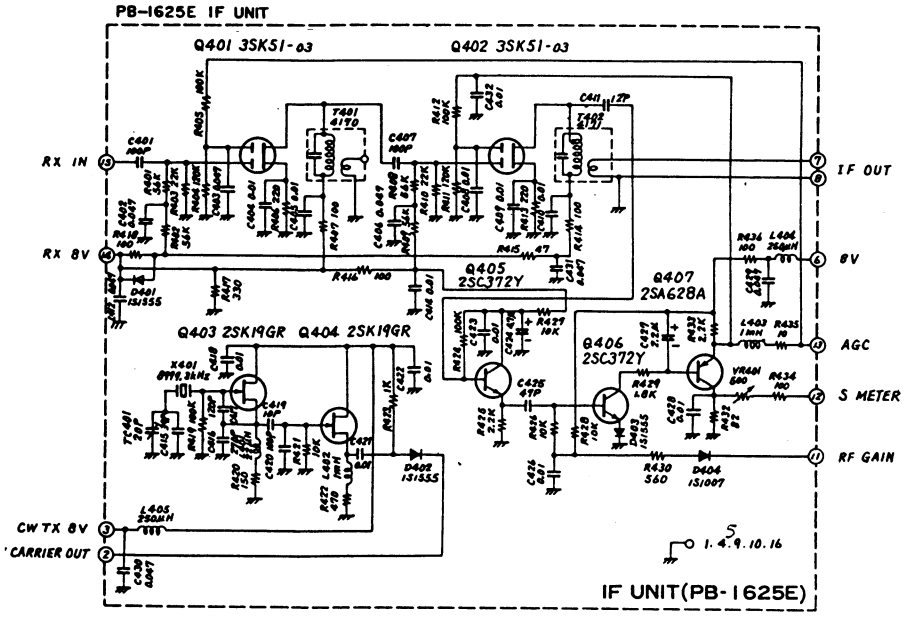

RF/MARKER UNIT(PB-1884B)




FILTER UNIT(PB-1873A)

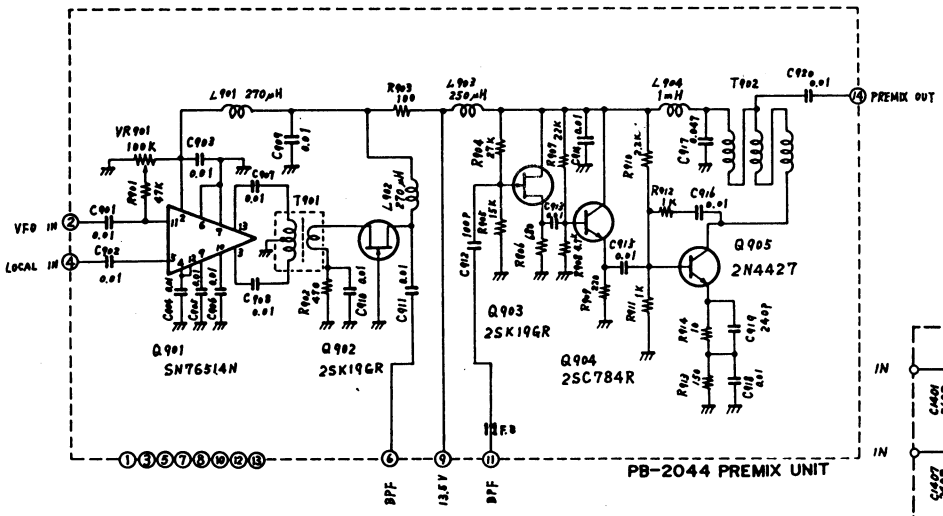



MIXER UNIT(PB-1631E)

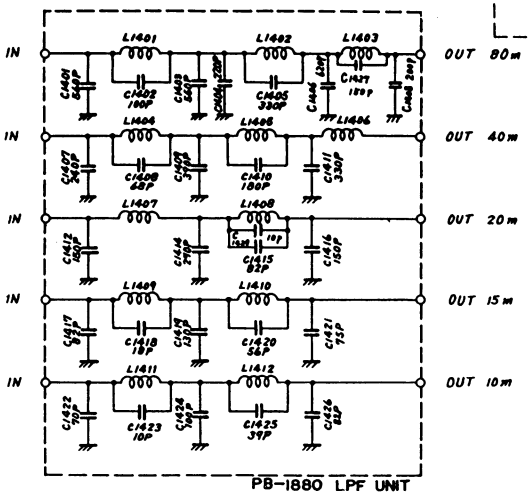



IF UNIT(PB-1625E)

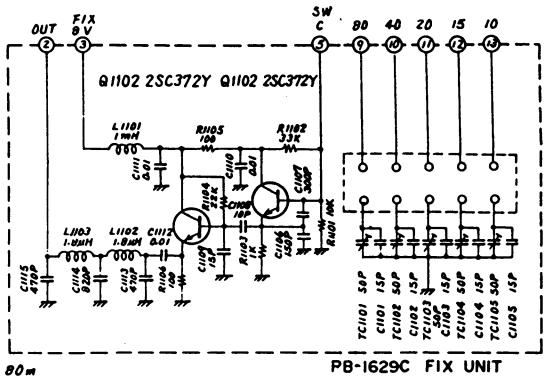
MC-Service



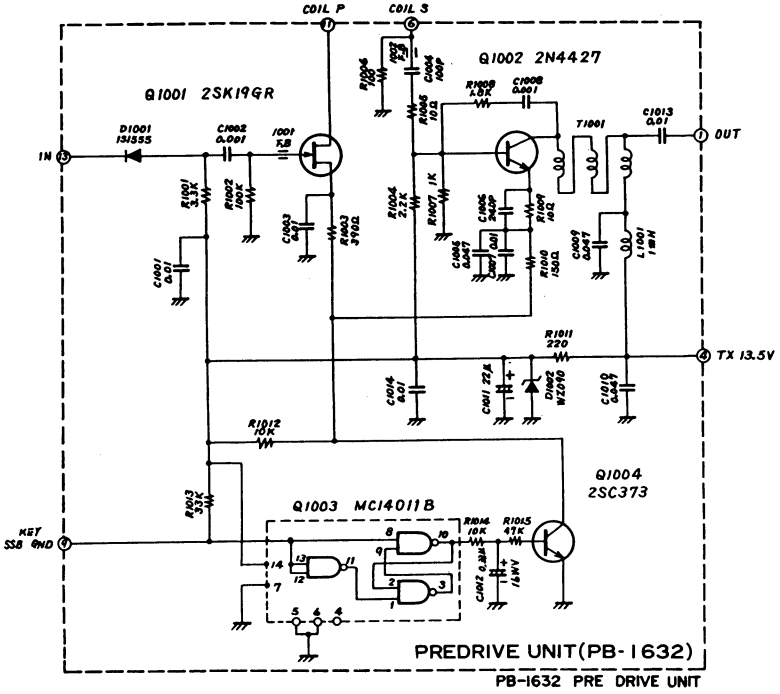

PREMIX UNIT(PB-2044)



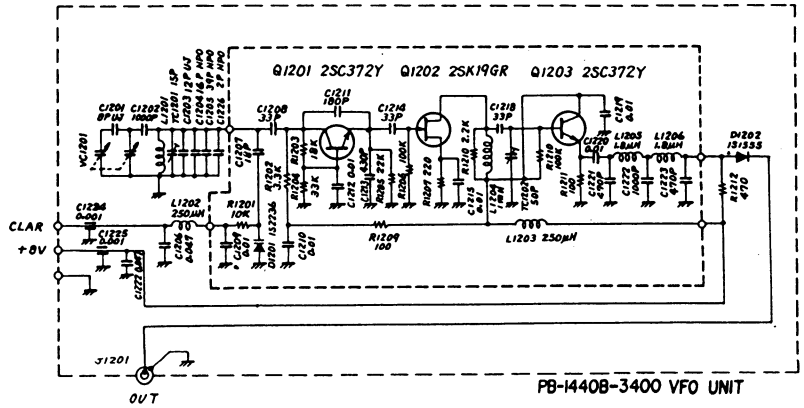

LPF UNIT(PB-1880)



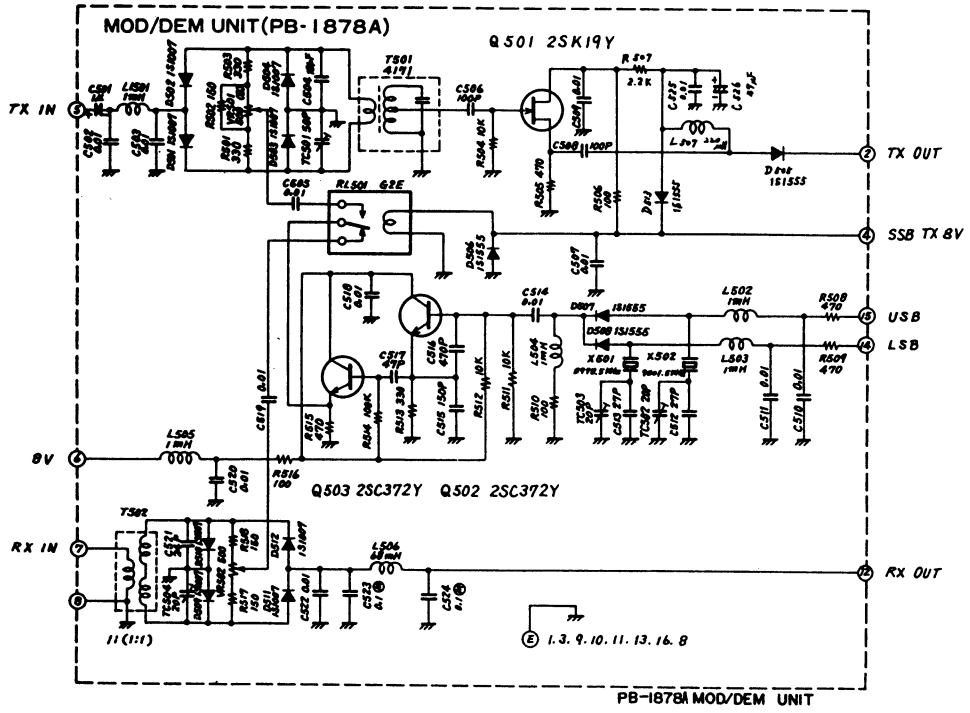

FIX UNIT(PB-1629)

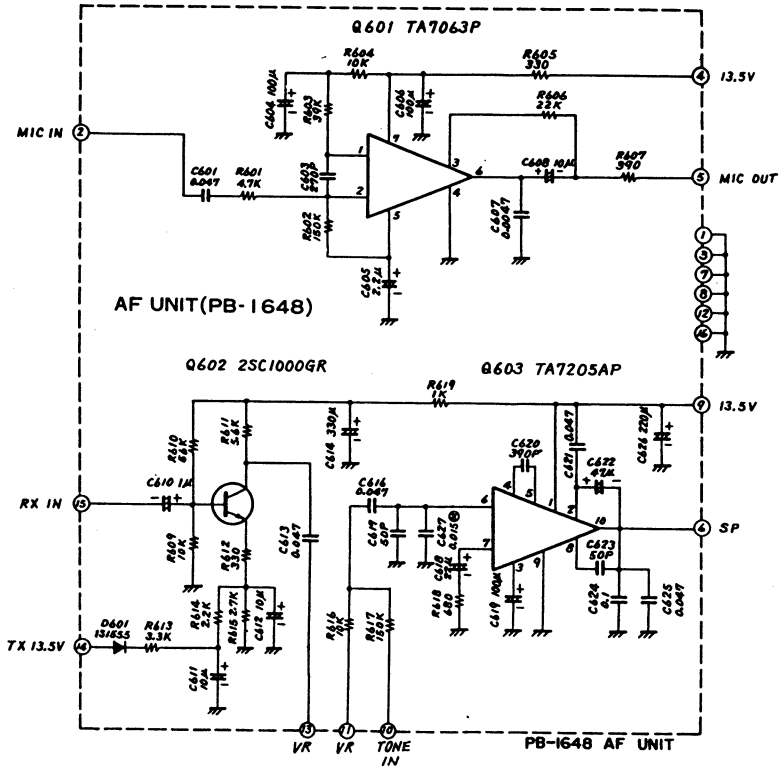


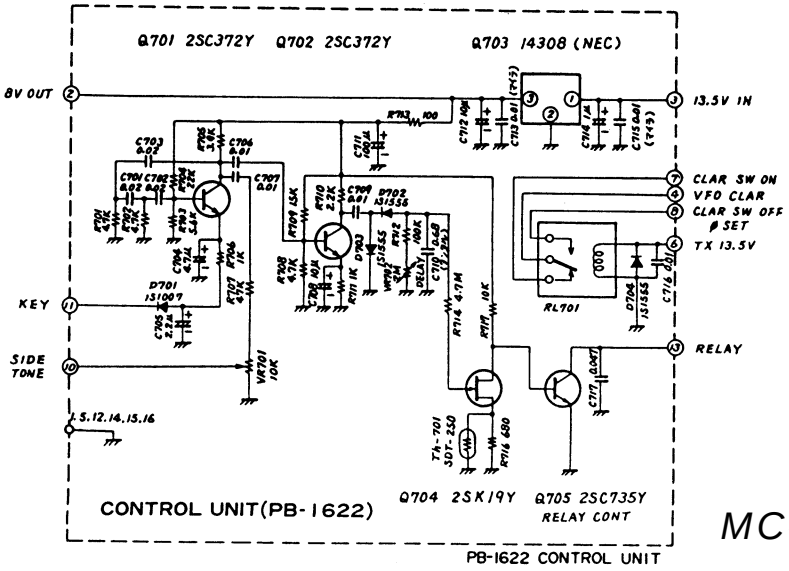

PREDRIVE UNIT(PB-1632)

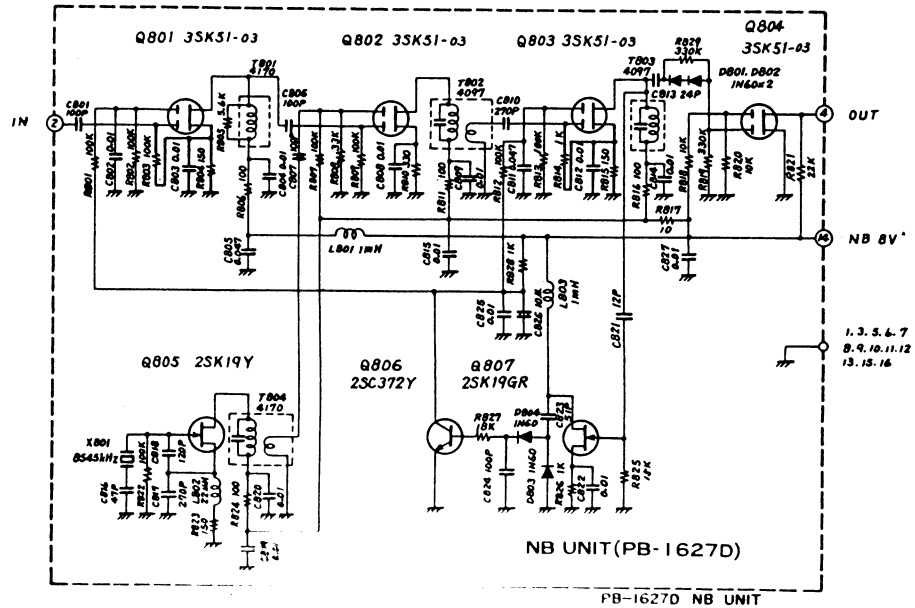



VFO UNIT(PB-1440B-3400)


MOD/DEM UNIT(PB-1878A)
Q501 2SK19Y
TX IN
TX OUT
SSB TX 8V
USB
LSB
8V
RX IN
RX OUT
Q503 2SC372Y Q502 2SC372Y
PB-1878A MOD/DEM UNIT


Q601 TA7063P
AF UNIT(PB-1648)
MIC IN
MIC OUT
13.5V
RX IN
SP
TX 13.5V
Q602 2SC1000GR
Q603 TA7205AP
VR
VR
TONE IN
PB-1648 AF UNIT


Q701 2SC372Y Q702 2SC372Y Q703 14308 (NEC)
8V OUT
13.5V IN
CLAR SW ON
VFO CLAR
CLAR SW OFF
TX 13.5V
KEY
RELAY
SIDE TONE
CONTROL UNIT(PB-1622)
Q704 2SK19Y Q705 2SC735Y
RELAY CONT
PB-1622 CONTROL UNIT


Q801 3SK51-03
Q802 3SK51-03
Q803 3SK51-03
Q804 3SK51-03
IN
OUT
NB 8V
Q805 2SK19Y
Q806 2SC372Y
Q807 2SK19GR
NB UNIT(PB-1627D)
PB-1627D NB UNIT

MC-Service